

SEQUENCE LISTING

<110> Brodsky, Gary

<120> Product and Methods for Diagnosis and Therapy for Cardiac and Skeletal Muscle Disorders

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<150> 60/456,642

<151> 2003-03-18

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<170> PatentIn version 3.2

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Val Arg Ser Leu Glu Thr Glu Asn Ala Gly Leu Arg Leu Arg Ile Thr
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Glu Ser Glu Glu Val Val Ser Arg Glu Val Ser Gly Ile Lys Ala Ala
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Tyr Glu Ala Glu Leu Gly Asp Ala Arg Lys Thr Leu Asp Ser Val Ala
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Lys Glu Arg Ala Arg Leu Gln Leu Glu Leu Ser Lys Val Arg Glu Glu
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Phe Lys Glu Leu Lys Ala Arg Asn Thr Lys Lys Glu Gly Asp Leu Ile
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Glu Gln Tyr Lys Lys Glu Leu Glu Lys Thr Tyr Ser Ala Lys Leu Asp
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<210> 9
 <211> 665
 <212> PRT
 <213> Mus musculus

<400> 9

Met Glu Thr Pro Ser Gln Arg Arg Ala Thr Arg Ser Gly Ala Gln Ala
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Ser Ser Thr Pro Leu Ser Pro Thr Arg Ile Thr Arg Leu Gln Glu Lys
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Glu Asp Leu Gln Glu Leu Asn Asp Arg Leu Ala Val Tyr Ile Asp Arg
 35 40 45

Gln Leu Ser Gln Leu Gln Lys Gln Leu Ala Ala Lys Glu Ala Lys Leu
 305 310 315 320

Arg Asp Leu Glu Asp Ser Leu Ala Arg Glu Arg Asp Thr Ser Arg Arg
 325 330 335

Leu Leu Ala Glu Lys Glu Arg Glu Met Ala Glu Met Arg Ala Arg Met
 340 345 350

Gln Gln Gln Leu Asp Glu Tyr Gln Glu Leu Leu Asp Ile Lys Leu Ala
 355 360 365

Leu Asp Met Glu Ile His Ala Tyr Arg Lys Leu Leu Glu Gly Glu Glu
 370 375 380

Glu Arg Leu Arg Leu Ser Pro Ser Pro Thr Ser Gln Arg Ser Arg Gly
 385 390 395 400

Arg Ala Ser Ser His Ser Ser Gln Ser Gln Gly Gly Gly Ser Val Thr
 405 410 415

Lys Lys Arg Lys Leu Glu Ser Ser Glu Ser Arg Ser Ser Phe Ser Gln
 420 425 430

His Ala Arg Thr Ser Gly Arg Val Ala Val Glu Glu Val Asp Glu Glu
 435 440 445

Gly Lys Phe Val Arg Leu Arg Asn Lys Ser Asn Glu Asp Gln Ser Met
 450 455 460

Gly Asn Trp Gln Ile Arg Arg Gln Asn Gly Asp Asp Pro Leu Met Thr
 465 470 475 480

Tyr Arg Phe Pro Pro Lys Phe Thr Leu Lys Ala Gly Gln Val Val Thr
 485 490 495

Ile Trp Ala Ser Gly Ala Gly Ala Thr His Ser Pro Pro Thr Asp Leu
 500 505 510

Val Trp Lys Ala Gln Asn Thr Trp Gly Cys Gly Ser Ser Leu Arg Thr
 515 520 525

Ala Leu Ile Asn Ser Thr Gly Glu Glu Val Ala Met Arg Lys Leu Val
 530 535 540

Arg Ser Leu Thr Met Val Glu Asp Asn Glu Asp Asp Asp Glu Asp Gly

545				550				555				560			
Glu	Glu	Leu	Leu	His 565	His	His	Arg	Gly	Ser 570	His	Cys	Ser	Gly	Ser 575	Gly
Asp	Pro	Ala	Glu 580	Tyr	Asn	Leu	Arg	Ser 585	Arg	Thr	Val	Leu	Cys 590	Gly	Thr
Cys	Gly	Gln 595	Pro	Ala	Asp	Lys	Ala 600	Ala	Gly	Gly	Ala	Gly 605	Ala	Gln	Val
Gly	Gly 610	Ser	Ile	Ser	Ser	Gly 615	Ser	Ser	Ala	Ser	Ser 620	Val	Thr	Val	Thr
Arg 625	Ser	Phe	Arg	Ser	Val 630	Gly	Gly	Ser	Gly	Gly 635	Gly	Ser	Phe	Gly	Asp 640
Asn	Leu	Val	Thr	Arg 645	Ser	Tyr	Leu	Leu	Gly 650	Asn	Ser	Ser	Pro	Arg 655	Ser
Gln	Ser	Ser	Gln 660	Asn	Cys	Ser	Ile	Met 665							

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<210> 11
 <211> 657
 <212> PRT
 <213> Gallus gallus

<400> 11

Met Ser Thr Pro Ser Gln Arg Arg Ser Gly Arg Gly Gly Gly Pro Ser
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 Gly Thr Pro Leu Ser Pro Thr Arg Ile Thr Arg Leu Gln Glu Lys Glu
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 Asp Leu Gln Glu Leu Asn Asp Arg Leu Ala Val Tyr Ile Asp Lys Val
 35 40 45
 Arg Ser Leu Glu Leu Glu Asn Ala Gly Leu Arg Leu Arg Ile Thr Glu
 50 55 60
 Ser Glu Glu Val Val Ser Arg Glu Val Ser Gly Ile Lys Ala Ala Tyr
 65 70 75 80
 Glu Ala Glu Leu Ala Asp Ala Arg Lys Thr Leu Asp Ser Val Ala Lys
 85 90 95
 Glu Arg Ala Arg Leu Gln Leu Glu Leu Ser Lys Val Arg Glu Glu His
 100 105 110
 Lys Glu Leu Lys Ala Arg Asn Ala Lys Lys Glu Ala Asp Leu Leu Ala
 115 120 125
 Ala Gln Ala Arg Leu Lys Asp Leu Glu Ala Leu Leu Asn Ser Lys Glu
 130 135 140
 Ala Ala Leu Ser Thr Ala Leu Gly Glu Lys Arg Asn Leu Glu Asn Glu
 145 150 155 160
 Val Arg Asp Leu Arg Ala Gln Val Ala Lys Leu Glu Gly Ala Leu Ser
 165 170 175
 Glu Ala Lys Lys Gln Leu Gln Asp Glu Met Leu Arg Arg Val Asp Ala
 180 185 190
 Glu Asn Arg Leu Gln Thr Leu Lys Glu Glu Leu Glu Phe Gln Lys Asn
 195 200 205
 Ile Tyr Ser Glu Glu Leu Arg Glu Thr Lys Arg Arg His Glu Thr Arg
 210 215 220
 Leu Val Glu Ile Asp Asn Gly Arg Gln Gln Glu Phe Glu Ser Lys Leu
 225 230 235 240
 Ala Glu Ala Leu Gln Asp Leu Arg Arg Gln His Glu Asp Gln Ile Arg
 245 250 255

His Tyr Arg Asp Glu Leu Glu Lys Thr Tyr Gly Ala Lys Leu Glu Asn
 260 265 270

Ala Lys Gln Ser Ala Glu Arg Asn Ser Ser Met Ala Gly Ala Ala His
 275 280 285

Glu Glu Leu Gln Gln Thr His Ile Arg Ile Asp Ser Leu Ser Ala Glu
 290 295 300

Leu Ser Gln Leu Gln Lys Gln Leu Ala Ala Lys Glu Ala Lys Leu Arg
 305 310 315 320

Glu Val Glu Glu Ala Leu Ser Arg Glu Arg Glu Gly Gly Arg Arg Leu
 325 330 335

Leu Ala Glu Lys Glu Arg Glu Met Ala Glu Met Arg Ala Arg Met Gln
 340 345 350

Gln Gln Leu Asp Glu Tyr Gln Glu Leu Leu Asp Ile Lys Leu Ala Leu
 355 360 365

Asp Met Glu Ile Asn Ala Tyr Arg Lys Leu Leu Glu Gly Glu Glu Glu
 370 375 380

Arg Leu Arg Leu Ser Pro Ser Pro Ser Ser Gln Arg Gly Ala Arg Ser
 385 390 395 400

Ser Gly Leu Gln His Ser Gly Ala Gly Ser Ala Lys Lys Arg Arg Leu
 405 410 415

Glu Asp Gly Glu Gly Arg Glu Gly Arg Glu Gly Arg Thr Ser Phe Ser
 420 425 430

His His Ala Arg Thr Ser Gly Arg Val Gly Val Glu Glu Val Asp Leu
 435 440 445

Glu Gly Arg Phe Val Arg Leu Arg Asn Lys Ser Asn Glu Asp Gln Ala
 450 455 460

Leu Gly Asn Trp Gln Val Lys Arg Gln Asn Gly Asp Asp Pro Pro Leu
 465 470 475 480

Thr Tyr Arg Phe Pro Pro Lys Phe Thr Leu Lys Ala Gly Gln Ala Val
 485 490 495

Thr Ile Trp Ala Ser Gly Ala Gly Ala Thr His Ser Pro Pro Ser Asp

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	530					535					540				
Val	Arg	Thr	Val	Ile	Ile	Asn	Asp	Asp	Asp	Glu	Asp	Glu	Glu	Asp	Asp
545					550					555					560
Glu	Val	Ser	Ile	His	His	Arg	His	His	His	Ser	Gly	Cys	Ser	Gly	Ser
				565					570					575	
Ala	Asp	Pro	Ala	Glu	Tyr	Asn	Leu	Arg	Ser	Arg	Thr	Val	Leu	Cys	Gly
			580					585					590		
Thr	Cys	Gly	Gln	Pro	Ala	Asp	Lys	Gly	Ser	Ala	Ala	Ala	Ala	Ser	Ser
		595					600					605			
Ala	Ser	Ser	Ala	Ser	Thr	Val	Thr	Val	Ser	Arg	Gly	Tyr	Arg	Ser	Ser
	610					615					620				
Gly	Gly	Gly	Ile	Gly	Glu	Gly	Leu	Leu	Gly	Arg	Ser	Tyr	Val	Leu	Gly
625					630					635					640
Gly	Ala	Gly	Pro	Arg	Arg	Gln	Ala	Pro	Ala	Pro	Gln	Gly	Cys	Ser	Ile
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Met

<210> 12
 <211> 2111
 <212> DNA
 <213> *Xenopus laevis*

<400> 12
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 ggccgtctac atcgacaagg tgcgttcct ggagctggag aacgcccggc tgcgtctgcg 180
 aatcaccgag tctgaagacg tcatcagccg cgaggtcacg ggcatcaagt cagcgtatga 240
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 gcagctggag ctgagcaaga tccgcgagga gcacaaggag ctgaaagcga ggaatgccaa 360
 gaaagagagc gatctattga cagcgcaggc cagactgaag gatttgagg ccctgttgaa 420

ctctaaagat gccgccctca ccacagcgct gggagagaag aggaatctgg agaagatgagat	480
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ccgcgagaac tgcaagtataa tgtaaccgga tgccaccact gttcttatca ccaagtgccc	2040
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TTTTATAAAG g	2111

<210> 13
 <211> 665
 <212> PRT

<213> *Xenopus laevis*

<400> 13

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			20					25					30		
Gly	Leu	Asn	Asp	Arg	Leu	Ala	Val	Tyr	Ile	Asp	Lys	Val	Arg	Ser	Leu
		35					40					45			
Glu	Leu	Glu	Asn	Ala	Arg	Leu	Arg	Leu	Arg	Ile	Thr	Glu	Ser	Glu	Asp
	50					55					60				
Val	Ile	Ser	Arg	Glu	Val	Thr	Gly	Ile	Lys	Ser	Ala	Tyr	Glu	Thr	Glu
65					70					75					80
Leu	Ala	Asp	Ala	Arg	Lys	Thr	Leu	Asp	Ser	Val	Ala	Lys	Glu	Arg	Ala
				85					90					95	
Arg	Leu	Gln	Leu	Glu	Leu	Ser	Lys	Ile	Arg	Glu	Glu	His	Lys	Glu	Leu
			100					105					110		
Lys	Ala	Arg	Asn	Ala	Lys	Lys	Glu	Ser	Asp	Leu	Leu	Thr	Ala	Gln	Ala
		115					120					125			
Arg	Leu	Lys	Asp	Leu	Glu	Ala	Leu	Leu	Asn	Ser	Lys	Asp	Ala	Ala	Leu
	130					135					140				
Thr	Thr	Ala	Leu	Gly	Glu	Lys	Arg	Asn	Leu	Glu	Asn	Glu	Ile	Arg	Glu
145					150					155					160
Leu	Lys	Ala	His	Ile	Ala	Lys	Leu	Glu	Ala	Ser	Leu	Ala	Asp	Thr	Lys
				165					170					175	
Lys	Gln	Leu	Gln	Asp	Glu	Met	Leu	Arg	Arg	Val	Asp	Thr	Glu	Asn	Arg
			180					185					190		
Asn	Gln	Thr	Leu	Lys	Glu	Glu	Leu	Glu	Phe	Gln	Lys	Ser	Ile	Tyr	Asn
		195					200					205			
Glu	Glu	Met	Arg	Glu	Thr	Lys	Arg	Arg	His	Glu	Thr	Arg	Leu	Val	Glu
	210					215					220				
Val	Asp	Asn	Gly	Arg	Gln	Arg	Glu	Phe	Glu	Ser	Lys	Leu	Ala	Asp	Ala
225					230					235					240

Leu His Glu Leu Arg Ala Gln His Glu Gly Gln Ile Gly Leu Tyr Lys
 245 250 255

Glu Glu Leu Gly Lys Thr Tyr Asn Ala Lys Leu Glu Asn Ala Lys Gln
 260 265 270

Ser Ala Glu Arg Asn Ser Ser Leu Val Gly Glu Ala Gln Glu Glu Ile
 275 280 285

Gln Gln Ser Arg Ile Arg Ile Asp Ser Leu Ser Ala Gln Leu Ser Gln
 290 295 300

Leu Gln Lys Gln Leu Ala Ala Arg Glu Ala Lys Leu Arg Asp Leu Glu
 305 310 315 320

Asp Ala Tyr Ala Arg Glu Arg Asp Ser Ser Arg Arg Leu Leu Ala Asp
 325 330 335

Lys Asp Arg Glu Met Ala Glu Met Arg Ala Arg Met Gln Gln Gln Leu
 340 345 350

Asp Glu Tyr Gln Glu Leu Leu Asp Ile Lys Leu Ala Leu Asp Met Glu
 355 360 365

Ile Asn Ala Tyr Arg Lys Leu Leu Glu Gly Glu Glu Glu Arg Leu Arg
 370 375 380

Leu Ser Pro Ser Pro Asn Thr Gln Lys Arg Ser Ala Arg Thr Ile Ala
 385 390 395 400

Ser His Ser Gly Ala His Ile Ser Ser Ser Ala Ser Lys Arg Arg Arg
 405 410 415

Leu Glu Glu Gly Glu Ser Arg Ser Ser Ser Phe Thr Gln His Ala Arg
 420 425 430

Thr Thr Gly Lys Val Ser Val Glu Glu Val Asp Pro Glu Gly Lys Tyr
 435 440 445

Val Arg Leu Arg Asn Lys Ser Asn Glu Asp Gln Ser Leu Gly Asn Trp
 450 455 460

Gln Ile Lys Arg Gln Ile Gly Asp Glu Thr Pro Ile Val Tyr Lys Phe
 465 470 475 480

Pro Pro Arg Leu Thr Leu Lys Ala Gly Gln Thr Val Thr Ile Trp Ala

485	490	495
Ser Gly Ala Gly Ala Thr Asn Ser Pro Pro Ser Asp Leu Val Trp Lys		
500	505	510
Ala Gln Ser Ser Trp Gly Thr Gly Asp Ser Ile Arg Thr Ala Leu Leu		
515	520	525
Thr Ser Ser Asn Glu Glu Val Ala Met Arg Lys Leu Val Arg Thr Val		
530	535	540
Val Ile Asn Asp Glu Asp Asp Glu Asp Asn Asp Asp Met Glu His His		
545	550	555
His His His His His His His His Asp Gly Gln Asn Ser Ser Gly Asp		
565	570	575
Pro Gly Glu Tyr Asn Leu Arg Ser Arg Thr Ile Val Cys Thr Ser Cys		
580	585	590
Gly Arg Pro Ala Glu Lys Ser Val Leu Ala Ser Gln Gly Ser Gly Leu		
595	600	605
Val Thr Gly Ser Ser Gly Ser Ser Ser Ser Ser Val Thr Leu Thr Arg		
610	615	620
Thr Tyr Arg Ser Thr Gly Gly Thr Ser Gly Gly Ser Gly Leu Gly Glu		
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Ser Pro Val Thr Arg Asn Phe Ile Val Gly Asn Gly Gln Arg Ala Gln		
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Val Ala Pro Gln Asn Cys Ser Ile Met		
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<210> 14

<211> 2078

<212> DNA

<213> Danio rerio

<400> 14

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caaaactagt ttcttttcag tttttttatg tcttatca	2078

<210> 15

<211> 659
 <212> PRT
 <213> Danio rerio

<400> 15

Met Glu Thr Pro Gly Gln Lys Arg Ser Ser Arg Gly Gly Val Thr Asn
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Val Leu Ser Pro Thr Arg Ile Ser Arg Leu Gln Glu Lys Glu Asp Leu
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Ser Asn Leu Asn Asp Arg Leu Ala Val Tyr Ile Asp Lys Val Arg Ser
 35 40 45

Leu Glu Val Glu Asn Ala Gly Leu Arg Met Arg Ile Thr Glu Ser Glu
 50 55 60

Thr Glu Ile Ser Arg Glu Leu Ser Gly Met Lys Ala Ala Tyr Glu Ala
 65 70 75 80

Glu Leu Ala Asp Ala Arg Lys Thr Leu Asp Ser Val Ala Lys Glu Arg
 85 90 95

Ala Arg Leu Gln Leu Glu Leu Ser Lys Val Arg Glu Asp Tyr Lys Glu
 100 105 110

Leu Lys Ala Arg Asn Gly Lys Lys Glu Ala Asp Leu Glu Ser Ala Leu
 115 120 125

Ala Arg Leu Lys Asp Leu Glu Ser Leu Leu Asn Ser Lys Asp Ala Ser
 130 135 140

Leu Ser Thr Ala Leu Gly Glu Lys Arg Thr Leu Glu Val Glu Val Arg
 145 150 155 160

Asp Leu Lys Ala Gln Leu Ala Lys Leu Glu Gly Ser Leu Asn Asp Ala
 165 170 175

Lys Lys Gln Leu Gln Asp Glu Met Leu Arg Arg Val Asp Ala Glu Asn
 180 185 190

Arg Ile Gln Thr Leu Lys Glu Glu Leu Glu Phe Gln Lys Asn Ile Tyr
 195 200 205

Ser Glu Glu Leu Arg Glu Ser Lys Arg Arg Tyr Glu Ser Arg Val Val
 210 215 220

Glu Ile Asp Ser Gly Arg Gln Gln Asp Tyr Glu Ser Lys Leu Ala Asp
 225 230 235 240

Ala Leu Thr Asp Leu Arg Asn Gln His Glu Glu Gln Leu Arg Ile Tyr
 245 250 255

Lys Glu Glu Ile Glu Lys Thr Tyr Asn Ser Lys Leu Glu Asn Ala Arg
 260 265 270

Ser Ser Ala Glu Arg Asn Ser His Leu Val Gly Ala Ala His Glu Glu
 275 280 285

Leu Gln Gln Thr Arg Val Arg Met Glu Gly Val Ser Ser Gln Leu Ser
 290 295 300

Gln Leu Gln Lys Gln Leu Ala Ala Arg Glu Ala Lys Ile Arg Glu Leu
 305 310 315 320

Glu Glu Ala Leu Ser Arg Glu Arg Asp Ile Leu Arg Arg Arg Leu Glu
 325 330 335

Asp Lys Glu Lys Glu Met Ala Glu Met Arg Gln Arg Met Gln Gln Gln
 340 345 350

Leu Asp Glu Tyr Gln Glu Leu Leu Asp Ile Lys Leu Ala Leu Asp Met
 355 360 365

Glu Ile Ser Ala Tyr Arg Lys Leu Leu Glu Gly Glu Glu Glu Arg Leu
 370 375 380

Arg Leu Ser Pro Ser Pro Pro Pro Ala Arg Gly Val Thr Val Thr Arg
 385 390 395 400

Ser Ser Gly Ser Gly Ser His Thr Arg Val Val Gln Ser Ser Thr Ser
 405 410 415

Arg Thr Ser Ser Gly Ser Ala Lys Lys Arg Arg Leu Asn Asp Asn Asp
 420 425 430

Ser Asp Ala Ser Ser Val Val Gly Gly Thr Val Thr Arg Thr Arg Ile
 435 440 445

Phe Gln Gln Ala Ser Ala Ser Gly Arg Val Thr Val Asp Glu Val Asp
 450 455 460

Leu Glu Gly Lys Phe Val Arg Leu Asn Asn Lys Ser Asp Gln Asp Gln
 465 470 475 480

Ser Leu Gly His Trp Gln Val Lys Arg Gln Ile Gly Ser Gly Thr Pro
485 490 495

Ile Val Tyr Lys Phe Pro Pro Lys Phe Asn Leu Lys Ala Gly Gln Thr
500 505 510

Val Thr Ile Trp Ala Ala Gly Ala Gly Gly Thr His Ser Pro Pro Ser
515 520 525

Asp Leu Val Trp Lys Thr Gln Asn Ser Trp Gly Ser Gly Asp Leu Phe
530 535 540

Gln Thr Thr Leu Ile Ser Ser Ser Gly Glu Glu Met Ala Met Arg Lys
545 550 555 560

Val Thr Arg Thr Leu Phe Gln Asp Glu Glu Asp Asp Glu Met Ala Ala
565 570 575

His Ser Thr Cys Gly Asp Ser Glu Tyr Asn Leu Arg Ser Arg Thr Val
580 585 590

Leu Cys Gly Ser Cys Gly Gln Pro Ser Asp Arg Asn Ser Ser Cys Val
595 600 605

Ser Ala Ser Ser Gly Val Ser Ser Ala Ser Arg Ser Phe Ser Ser Gly
610 615 620

Gly Gly Gly Gly Leu Thr Glu Ala Phe Val Ser Pro Ser His Phe Ile
625 630 635 640

Val Ser Asn Asp Lys Pro Arg Gln Ala Gly Pro Lys Val Asp Asn Cys
645 650 655

Ser Ile Met

<210> 16
<211> 15
<212> PRT
<213> Mus musculus

<400> 16

Leu Leu Gly Asn Ser Ser Pro Arg Ser Gln Ser Ser Gln Asn Cys
1 5 10 15

<210> 17
<211> 17

<212> PRT
<213> Gallus gallus

<400> 17

Val Leu Gly Gly Ala Gly Pro Arg Arg Gln Ala Pro Ala Pro Gln Gly
1 5 10 15

Cys

<210> 18
<211> 15
<212> PRT
<213> Xenopus laevis

<400> 18

Ile Val Gly Asn Gly Gln Arg Ala Gln Val Ala Pro Gln Asn Cys
1 5 10 15

<210> 19
<211> 20
<212> PRT
<213> Danio rerio

<400> 19

Ile Val Ser Asn Asp Lys Pro Arg Gln Ala Gly Pro Lys Val Asp Asn
1 5 10 15

Cys Ser Ile Met
20

<210> 20
<211> 18
<212> PRT
<213> Homo sapiens

<400> 20

Leu Leu Gly Asn Ser Ser Pro Arg Thr Gln Ser Pro Gln Asn Cys Ser
1 5 10 15

Ile Met

<210> 21
<211> 18
<212> PRT
<213> Mus musculus

<400> 21

Leu Leu Gly Asn Ser Ser Pro Arg Ser Gln Ser Ser Gln Asn Cys Ser

1 5 10 15

Ile Met

<210> 22
<211> 20
<212> PRT
<213> Gallus gallus

<400> 22

Val Leu Gly Gly Ala Gly Pro Arg Arg Gln Ala Pro Ala Pro Gln Gly
1 5 10 15

Cys Ser Ile Met
20

<210> 23
<211> 18
<212> PRT
<213> Xenopus laevis

<400> 23

Ile Val Gly Asn Gly Gln Arg Ala Gln Val Ala Pro Gln Asn Cys Ser
1 5 10 15

Ile Met

<210> 24
<211> 20
<212> PRT
<213> Danio rerio

<400> 24

Ile Val Ser Asn Asp Lys Pro Arg Gln Ala Gly Pro Lys Val Asp Asn
1 5 10 15

Cys Ser Ile Met
20